周报(2014.11.17-2014.11.23)

1． 本周工作

1) in situ

In situ 是一个拉丁文词组，字面上的意思是指“在原位”，于不同领域中有不同用法。在可视化领域，in situ 指在并行超级计算机上进行科学模拟计算的同时，直接在解算机(solver)上进行可视化和分析的渲染或与计算。而在传统方案中，可视化计算一般在较小型但交互性更强的计算机而非超级计算机上进行。

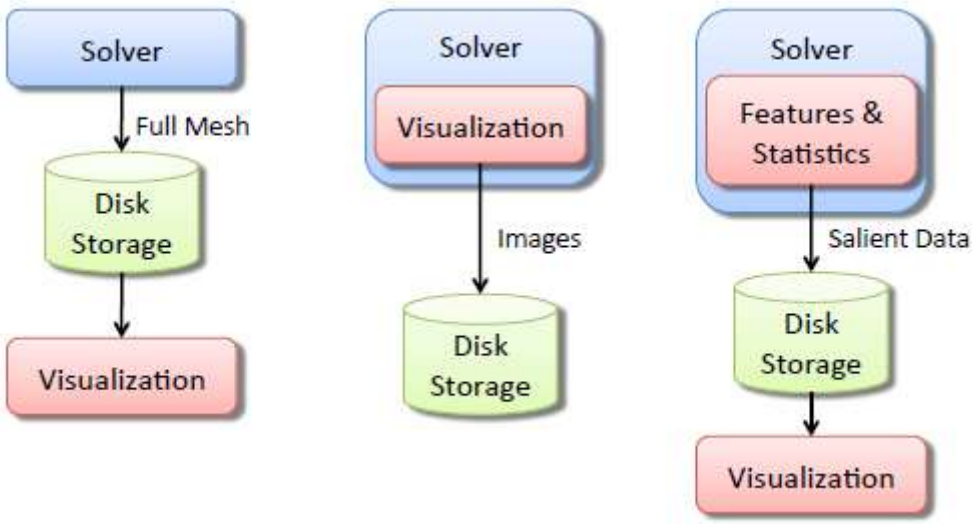

Figure 1: In situ 可视化和传统方案的区别。（左）传统科学模拟计算和可视化过程。（中）完全 in situ 的可视化，在 solver 上完成全部的可视化计算和渲染，仅输出图像用于存储和屏幕输出。(右）部分 in situ 的可视化，在 solver 中计算一部分重要数据，输出更易于可视化的中间结果。

在高性能计算领域，人们大量使用大规模并行构架以提高效率。但随着超级计算机的不断发展更新，I/O（网络传输、数据存储）承载能力的提升却无法跟上计算能力提升的步伐，数据的传输与存储效率已经成为制约系统整体效率的瓶颈[1,2,3,4,5,6]。另一方面，有研究表明可视化计算，包括绘制，可以在现行的超级计算机上十分效率地运行，仅仅会产

生少量额外的时间损耗[7]。In situ 地可视化可以有效地减少 I/O 操作开销，也因此被越来越广泛的研究和使用，近年来已有大量成功的样例[8,9,10,11,12,13,14]。

目前还只是看了少量几篇文章，而且都没有细看，仅大致了解了一下什么是 in situ，以及 in situ 算法所期望的效果（文章的贡献），大致总结一下：

应用场景

应用于超大数据量的科学模拟领域。每时每刻都有巨量的数据产生，甚至多到无法被传输很存储。

目的

减少传输和存储开销。关于为什么 in situ 多用于科学可视化而信息可视化中没有见到，原因可能有：(1)数据规模和产生速度，没有如此大到甚至超过硬盘的写入速度。(2)in situ 尽力避免存储环节，而信息可视化的数据一般不会是生成完就丢的。(3)事实上，由于 in situ 的特性，这些方法的交互性都是比较低的。

方法

提供数据的概览或者通过压缩提供原始数据的完整重构方式。

2) visketch

稍微做了一些了解。目前感觉是抽象程度不够。感性的讲大概就是 switch…case 和多态的区别吧，所以在进一步提供可编程模块的时候缺乏了一些标准化的人机交流接口。

下周任务

- 参与 visketch 的讨论，了解整个项目的内容和流程。

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